

Geodetic Challenges in modernization of the Vertical Datum of Nepal

Sushmita Timilsina¹, Suraj Bahadur K.C.²

¹ Survey Officer, Survey Department, Ministry of Land Management, Co-operatives, Federal Affairs and General Administration, qust04sharma@gmail.com

² Chief Survey Officer, Survey Department, Ministry of Land Management, Co-operatives, Federal Affairs and General Administration, kcsuraj21@gmail.com

The height determination infrastructure of Nepal faces complex challenges due to its diverse topography, landlocked geography, active tectonic setting, and frequent natural disasters. As a landlocked country, Nepal has adopted the Mean Sea Level (MSL) of the Bay of Bengal which is the nearest accessible sea level as its vertical reference. However, MSL is neither constant nor consistent globally, which makes Nepal's vertical datum ambiguous.

The advances in space geodetic technology presents promising opportunities to modernize vertical datum of country like Nepal. This abstract assesses the principal challenges in transitioning Nepal's vertical datum toward the International Height Reference System (IHRs) for compatibility with global standards. The major obstacles include the shift from an MSL-based to a geoid-based system, reliability of the existing leveling network, and the effects of ongoing tectonic deformation. It also outlines practical strategies for adoption of a recent geoid model of the country to align with the IHRs which would standardize height measurements across the region, supporting critical infrastructure development, improved disaster modeling, and seamless cross-border geodetic data exchange.